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EXAMINER	
LIU, LI	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/815,033	Applicant(s) DORRER ET AL.	
	Examiner LI LIU	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 September 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-10,12-14,19-23,25,26,28,29 and 31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-10,12-14,19-23,25,26,28,29 and 31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In view of the amendment, the Final Office Action mailed on 07/09/2008 has been withdrawn. A new Office Action in response to the amendment is as follows.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claim 31 is rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing (Reference the May 15, 2008 memorandum issued by Deputy Commissioner for Patent Examining Policy, John J. Love, titled "Clarification of 'Processes' under 35 U.S.C. 101"). The instant claim neither transforms underlying subject matter nor positively ties to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 9, 19-23, 25 and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

1). Claim 9 recites the limitation "[a] method of <u>APol-PSK</u> transmission comprising: using an electronic data signal to drive a Mach-Zehnder modulator having a polarization rotation device in at least one arm to <u>provide</u> simultaneous polarization alternation and optical data encoding by phase shift keying between two optical bit<u>s</u> separated by an <u>even number of bit periods</u> to generate an <u>APol-PSK</u> signal; wherein input signals to both arms of the Mach-Zehnder modulator have polarizations that are the same". According to the original disclosure, the PSK is "non-differential". The original disclosure teaches that for <u>APol-DPSK</u>, a Mach-Zehnder modulator optically coupled to a laser source having a polarization rotation device in at least one arm can provide simultaneous polarization alternation and optical data encoding by phase shift keying between two optical bits separated by an <u>even number of bit periods</u> to generate an <u>APol-DPSK</u> signal. The original disclosure does not teach to generate the <u>APol-PSK</u> (non-differential) signal by a (non-precoding) electronic data signal and by phase shift keying between two optical bits separated by an <u>even number of bit periods</u>.

2). Claim 25, and thus depending claims 19-23, recites the limitation "[a]n optical transmitter for APol-PSK transmission comprising: ...; drive circuitry coupled to the MZ modulator device to drive a MZ modulator to simultaneously provide polarization alternation and optical data encoding of an optical signal using phase shift keying between two optical bits separated by an even number of bit periods". According to the original disclosure, the PSK is "non-differential". The original disclosure teaches that for APol-DPSK, a Mach-Zehnder modulator optically coupled to a laser source having a polarization rotation device in one arm can provide simultaneous polarization alternation and optical data encoding by phase shift keying between two optical bits separated by an even number of bit periods to generate an APol-DPSK signal. The original disclosure does not teach to generate the APol-PSK (non-differential) signal by a (non-precoding) drive circuitry and using phase shift keying between two optical bits separated by an even number of bit periods.

3). Claim 28 recites the limitation "[a]n optical transmission system for APol-PSK transmission comprising: ..., a modulator means having a polarization rotation device to provide simultaneous polarization alternation and optical data encoding by phase shift keying between two optical bits separated by an even number of bit periods to generate an APol-PSK signal". According to the original disclosure, the PSK is "non-differential". The original disclosure teaches that for APol-DPSK, a Mach-Zehnder modulator, driven by precoded data, optically coupled to a laser source having a polarization rotation device in one arm can provide simultaneous polarization alternation and optical data encoding by phase shift keying between two optical bits separated by an even number

of bit periods to generate an APol-DPSK signal. The original disclosure does not teach to generate the APol-PSK (non-differential) signal by a modulator means and phase shift keying between two optical bits separated by an even number of bit periods.

6. Claims 9, 19-23, 25 and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

1). Claim 9 recites the limitation "[a] method of APol-PSK transmission comprising: using an electronic data signal to drive a Mach-Zehnder modulator having a polarization rotation device in at least one arm to provide simultaneous polarization alternation and optical data encoding by phase shift keying between two optical bits separated by an even number of bit periods to generate an APol-PSK signal; wherein input signals to both arms of the Mach-Zehnder modulator have polarizations that are the same". According to the original disclosure, the PSK is "non-differential". The original disclosure teaches that for APol-DPSK, a Mach-Zehnder modulator optically coupled to a laser source having a polarization rotation device in at least one arm can provide simultaneous polarization alternation and optical data encoding by phase shift keying between two optical bits separated by an even number of bit periods to generate an APol-DPSK signal. The original disclosure does not teach how to generate the APol-PSK (non-differential) signal by just a (non-precoding) electronic data signal, and by phase shift keying between two optical bits separated by an even number of bit periods.

2). Claim 25, and thus depending claims 19-23, recites the limitation "[a]n optical transmitter for APol-PSK transmission comprising: ...; drive circuitry coupled to the MZ modulator device to drive a MZ modulator to simultaneously provide polarization alternation and optical data encoding of an optical signal using phase shift keying between two optical bits separated by an even number of bit periods". According to the original disclosure, the PSK is "non-differential". The original disclosure teaches that for APol-DPSK, a Mach-Zehnder modulator optically coupled to a laser source having a polarization rotation device in one arm can provide simultaneous polarization alternation and optical data encoding by phase shift keying between two optical bits separated by an even number of bit periods to generate an APol-DPSK signal. The original disclosure does not teach how to generate the APol-PSK (non-differential) signal by just a (non-precoding) drive circuitry and using phase shift keying between two optical bits separated by an even number of bit periods.

3). Claim 28 recites the limitation "[a]n optical transmission system for APol-PSK transmission comprising: ..., a modulator means having a polarization rotation device to provide simultaneous polarization alternation and optical data encoding by phase shift keying between two optical bits separated by an even number of bit periods to generate an APol-PSK signal". According to the original disclosure, the PSK is "non-differential". The original disclosure teaches that for APol-DPSK, a Mach-Zehnder modulator, driven by precoded data, optically coupled to a laser source having a polarization rotation device in one arm can provide simultaneous polarization alternation and optical data encoding by phase shift keying between two optical bits separated by an even number

<u>of bit periods</u> to generate an <u>APol-DPSK</u> signal. The original disclosure does not teach how to generate the <u>APol-PSK</u> (non-differential) signal by just a modulator means and phase shift keying between two optical bits separated by an <u>even number of bit periods</u>.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 4, 10 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chraplyvy et al (US 2003/0007216) in view of Hodzic et al (Hodzic et al: "Improvement of System Performance in N x 40-Gb/s WDM Transmission Using Alternate Polarizations", IEEE Photonics Techmology Letters, Vol. 15, No. 1, Jan 2003, pages 153-155) and Miyamoto et al (US 7,116,917).

1). With regard to claim 10, Chraplyvy et al a method comprising:

precoding an electronic data signal (e.g., the differential encoder 313 in Figure 3);

modulating the output of an optical source using the precoded electronic data signal (e.g., the modulator 105 drove by the electronic data from the encoder 313) and differential phase shift keying between two optical bits (Figure 4e, the optical DPSK signal);

demodulating the DPSK signal using one bit delay line interferometer (502 in Figure 5).

But, Chraplyvy et al does not disclose: the output from the modulator is differential phase shift keying between two optical bits separated by an even number of bit periods to generate an encoded optical signal; alternating the polarization of the encoded optical signal using a modulator such that successive optical bits have substantially orthogonal polarizations to generate an APol-DPSK signal; and demodulating the APol-DPSK signal using an even bit delay line interferometer.

However, it is well known in the art that the alternate polarization format with adjacent bits have orthogonal polarization can be used to significantly reduce the intrachannel nonlinear distortion. Hodzic teaches such a method to generate APol-RZ signal (alternate polarization return-to-zero signal) (Figure 1). Hodzic et al teaches a RZ coder, modulating the output of an optical source using the RZ electronic data signal, alternating the polarization of the RZ optical signal using a modulator (polarization modulator in Figure 1) such that successive optical bits have substantially orthogonal polarizations to generate an APol-RZ signal.

Hodzic discloses that the APol-RZ signals with orthogonal polarization between adjacent bits cause significant improvement of system performance through suppression of non-linear effects compared with RZ and NRZ format, the APol-RZ modulation format significantly improves the maximum input power, shows 7-10 dB improvement compared to RZ and NRZ format, the alternate polarization of adjacent bits reduces the power transfer between adjacent bits resulting also in suppression of

intrachannel effects; and the APol-RZ possesses better PMD characteristics than RZ and NRZ, has better dispersion tolerance; the maximum transmission distance can be enhanced with factor of 2 by using this modulation method. Hodzic et al teaches that the alternate polarization format remains the best choice modulation format (page 155 left column).

As the polarization modulator as taught by Hodzic is applied to the DPSK format of Chraplyvy et al, that is, combine a polarization modulator with the phase modulator (105 in Figure 3 of Chraplyvy), it is obvious to one skilled in the art that the differential encoder (e.g., 313 in Figure 3) must be set as a two-bit delay precoder and the demodulator (501 in Figure 5) must be a two-bit delay line interferometer. After the polarization modulator, the bits 1, 3, 5, ... 2n-1 have one kind of polarization, and the bits 2, 4, 6, ... 2n has another polarization which is orthogonal to the polarization of "odd" bits; at the receiver, theoretically, the "odd" bits and the "even" bits do not interfere (or coherently add or subtract) with each other at the balanced detector because they are orthogonally polarized. That is, the two sets of data bits can be treated independently; since bit "1" and bit "3" has a two-bit periods of time interval, to get the DPSK benefit and restore the original data, the bits 1, 3, 5, ... 2n-1 need to be encoded by differentially phase shift keying between any two bits separated by two-bit slots (or even number of bit periods), so to generate "odd" bits conventional DPSK signal, same is for bits 2, 4, 6, ... 2n. And to decode the DPSK signal or restore the original data, the 2-bit delay interferometer must be used since each set of data is encoded by two-bit delay at the transmitter.

To precode the data by two-bit delay is not new in the art; theoretically, the conventional DPSK format can be generate with differentially phase shift keying between any two bits separated by one bit slot, two-bit slots or other number of bit slots as long as the demodulator has the same number of bit delay. Miyamoto et al, in the same field of endeavor, teaches a method to generate a DPSK format with a precoder having delay of 2-bit slots (2 in Figure 17, column 16 line 34 to column 7 line 16, and column 27 line 24-34), the precoded signal drives the phase modulator (5 in Figure 17), and differential phase shift keying signal (encoded with two bits separated by two bits) is outputted from the phase modulator (Figure 18). Miyamoto et al also teaches a two-bit delay interferometer (5 in Figure 17) to demodulate the differential phase shift keying signal and get the RZ (with phase modulated) signal (Figure 18, note: except the phase, Figure 18G is the same as the data signal shown in 18A, the direct detector 66 which responses to the intensity will restore the data as Figure 18A).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the alternate polarization format and two-bit delay precoder and demodulator as taught by Hodzic et al and Miyamoto et al to the system of Chraplyvy et al so that a APol-DPSK modulation format can be obtained, and the intrachannel nonlinear distortion can be reduced, and system performance can be significantly enhanced, and the transmission distance can be significantly increased.

2). With regard to claim 4, Chraplyvy et al and Hodzic et al and Miyamoto et al disclose all of the subject matter as applied to claim 10 above, and Hodzic et al further discloses wherein the optical signal is launched into the modulator having a polarization

oriented at a predetermined angle (page 153, the optical signal is launched into the polarization modulator having a polarization oriented at $\pi/4$) such that the polarization of successive optical bits of the output signal are substantially orthogonal.

3. With regard to claim 29, Chraplyvy et al discloses an optical transmission system (Figures 2 and 5) for DPSK transmission comprising:

an optical source (the DFB Laser 101 in Figure 3);

a precoder device (the Differential Encoder 313 in Figure 3) for precoding an electronic data signal;

an optical phase-shift-keying data modulator (the phase modulator 105 in Figure 3) optically coupled to the laser source and driven by a precoded electronic data signal from the precoder device to produce an optical DPSK signal (Figure 4);

a demodulator (502 in Figure 5) comprising an one bit delay line interferometer.

But, Chraplyvy et al does not disclose: an APol-DPSK transmission, wherein electronic data to be transmitted is optically encoded by the data modulator as differential phase shift keying between two optical bits separated by an even number of bit periods; a polarization alternator optically coupled to the data modulator to provide polarization alternation of the output of the data modulator; and a demodulator comprising an even bit delay line interferometer.

However, it is well known in the art that the alternate polarization format with adjacent bits have orthogonal polarization can be used to significantly reduce the intrachannel nonlinear distortion. Hodzic teaches such a method to generate APol-RZ signal (alternate polarization return-to-zero signal) (Figure 1). Hodzic et al teaches an

APol-RZ transmission, wherein electronic data to be transmitted is optically encoded by the RZ modulator (MZI in Figure 1a); a polarization alternator (the Polarization Modulator in Figure 1a) optically coupled to the data modulator to provide polarization alternation of the output of the data modulator.

Hodzic discloses that the APol-RZ signals with orthogonal polarization between adjacent bits cause significant improvement of system performance through suppression of non-linear effects compared with RZ and NRZ format, the APol-RZ modulation format significantly improves the maximum input power, shows 7-10 dB improvement compared to RZ and NRZ format, the alternate polarization of adjacent bits reduces the power transfer between adjacent bits resulting also in suppression of intrachannel effects; and the APol-RZ possesses better PMD characteristics than RZ and NRZ, has better dispersion tolerance; the maximum transmission distance can be enhanced with factor of 2 by using this modulation method. Hodzic et al teaches that the alternate polarization format remains the best choice modulation format (page 155 left column).

As the polarization modulator as taught by Hodzic is applied to the DPSK format of Chraplyvy et al, that is, combine a polarization modulator with the phase modulator (105 in Figure 3 of Chraplyvy), it is obvious to one skilled in the art that the differential encoder (e.g., 313 in Figure 3) must be set as a two-bit delay precoder and the demodulator (501 in Figure 5) must be a two-bit delay line interferometer. After the polarization modulator, the bits 1, 3, 5, … 2n-1 have one kind of polarization, and the bits 2, 4, 6, … 2n has another polarization which is orthogonal to the polarization of

“odd” bits; at the receiver, theoretically, the “odd” bits and the “even” bits do not interfere (or coherently add or subtract) with each other at the balanced detector because they are orthogonally polarized. That is, the two sets of data bits can be treated independently; since bit “1” and bit “3” has a two-bit periods of time interval, to get the DPSK benefit and restore the original data, the bits 1, 3, 5, ... 2n-1 need to be encoded by differentially phase shift keying between any two bits separated by two-bit slots (or even number of bit periods), so to generate “odd” bits conventional DPSK signal, same is for bits 2, 4, 6, ... 2n. And to decode the DPSK signal or restore the original data, the 2-bit delay interferometer must be used since each set of data is encoded by two-bit delay at the transmitter.

To precode the data by two-bit delay is not new in the art; theoretically, the conventional DPSK format can be generate with differentially phase shift keying between any two bits separated by one bit slot, two-bit slots or other number of bit slots as long as the demodulator has the same number of bit delay. Miyamoto et al, in the same field of endeavor, teaches a method to generate a DPSK format with a precoder having delay of 2-bit slots (2 in Figure 17, column 16 line 34 to column 7 line 16, and column 27 line 24-34), the precoded signal drives the phase modulator (5 in Figure 17), and differential phase shift keying signal (encoded with two bits separated by two bits) is outputted from the phase modulator (Figure 18). Miyamoto et al also teaches a two-bit delay interferometer (5 in Figure 17) to demodulate the differential phase shift keying signal and get the RZ (with phase modulated) signal (Figure 18, note: except the phase,

Figure 18G is the same as the data signal shown in 18A, the direct detector 66 which responses to the intensity will restore the data as Figure 18A).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the alternate polarization format and two-bit delay precoder and demodulator as taught by Hodzic et al and Miyamoto et al to the system of Chraplyvy et al so that a APol-DPSK modulation format can be obtained, and the intrachannel nonlinear distortion can be reduced, and system performance can be significantly enhanced, and the transmission distance can be significantly increased.

9. Claims 2, 3 and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chraplyvy et al and Hodzic et al and Miyamoto et al as applied to claim 10 above, and in further view of Heismann et al (Heismann et al: “High-Speed Polarization Scrambler with Adjustable Phase Chirp”, IEEE Journal of Selected Topic in Quantum Electronics, Vol. 2, No. 2, June 1996, page 311-318).

1). With regard to claims 2 and 3, Chraplyvy et al and Hodzic et al and Miyamoto et al disclose all of the subject matter as applied to claim 10 above, and Hodzic et al further discloses that the a phase modulator driven by a RF clock signal. But, Chraplyvy et al and Hodzic et al and Miyamoto et al do not expressly disclose wherein the modulator is a phase modulator driven by a sinusoidal RF voltage, or driven by a train of square pulses.

However, it is well known in the art that the clock signal can be sinusoidal signal or a train of square pulses. And in Figure 4c, Chraplyvy et al discloses that a square-wave shape pulse can be used to drive the phase modulator. Another prior art,

Heismann teaches that the polarization modulator is a phase modulator driven by a sinusoidal RF voltage (Figures 1 and 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply either a sinusoidal RF voltage or a train of square pulses to the phase modulator of the system of Chraplyvy et al and Hodzic et al and Miyamoto et al so that the desired polarization and phase modulation can be obtained.

2). With regard to claims 5 and 6, Chraplyvy et al and Hodzic et al and Miyamoto et al disclose all of the subject matter as applied to claim 10 above, But Chraplyvy et al and Hodzic et al and Miyamoto et al does not expressly discloses wherein the modulator is a Mach-Zehnder modulator including a polarization rotation device in at least one arm; and wherein the polarization rotation device is a half-wave plate.

However, Heismann et al teaches a polarization modulator (Figure 2), wherein the modulator is a Mach-Zehnder modulator including a polarization rotation device (the 90 degree Rotated PMF) in at least one arm; and wherein the polarization rotation device is a half-wave plate (the 90 degree rotated PMF is a half-wave plate: retards one polarization by half wavelength or π phase retardation, so to rotate the polarization by 90 degree).

Heismann et al teaches a modulator for high speed polarization and phase modulation. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the high-speed modulator as taught by Heismann to the system of Chraplyvy et al and Hodzic et al and Miyamoto et al so that a high-speed alternate polarization DPSK system can be obtained.

3). With regard to claims 7 and 8, Chraplyvy et al and Hodzic et al and Miyamoto et al and Heisman et al disclose all of the subject matter as applied to claims 10 and 5 above, and Hodzic et al further discloses that the a phase modulator driven by a RF clock signal at half the bit rate (20 GHz clock signal, 40 Gb/s data signal). But, Chraplyvy et al and Hodzic et al and Miyamoto et al do not expressly disclose wherein the modulator is a phase modulator driven by a sinusoidal RF voltage, or driven by a train of square pulses at half the bit rate.

It is well known in the art that the clock signal can be sinusoidal signal or a train of square pulses. And in Figure 4c, Chraplyvy et al discloses that a square-wave shape pulse can be used to drive the phase modulator. And Heismann teaches that the polarization modulator is a phase modulator driven by a sinusoidal RF voltage (Figures 1 and 2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply either a sinusoidal RF voltage or a train of square pulses to the phase modulator so that desired polarization and phase modulation can be obtained.

10. Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chraplyvy et al (US 2003/0007216) in view of Hodzic et al (Hodzic et al: "Improvement of System Performance in N x 40-Gb/s WDM Transmission Using Alternate Polarizations", IEEE Photonics Techmology Letters, Vol. 15, No. 1, Jan 2003, pages 153-155) and Miyamoto et al (US 7,116,917) and Heismann et al (Heismann et al: “High-Speed Polarization Scrambler with Adjustable Phase Chirp”, IEEE Journal of Selected Topic in Quantum Electronics, Vol. 2, No. 2, June 1996, page 311-318).

1). With regard to claims 12 and 14, Chraplyvy et al a method of DPSK transmission comprising:

precoding an electronic data signal (e.g., the differential encoder 313 in Figure 3;

using the precoded electronic data signal to drive a Mach-Zehnder modulator (e.g., the modulator 105 drove by the electronic data from the encoder 313) to generate DPSK signal; and demodulate the DPSK using one bit delay line interferometer (Figure 5).

But, Chraplyvy et al does not disclose: the modulator including a polarization rotation device in at least one arm to provide simultaneous polarization alternation and optical data encoding by phase shift keying between two optical bits separated by an even number of bit periods to generate an APol-DPSK signal; wherein input signals to both arms of the Mach-Zehnder modulator have polarizations that are the same; and demodulating the APol-DPSK signal using an even bit delay line interferometer.

However, it is well known in the art that the alternate polarization format with adjacent bits have orthogonal polarization can be used to significantly reduce the intrachannel nonlinear distortion. Hodzic teaches such a method to generate APol-RZ signal (alternate polarization return-to-zero signal) (Figure 1). Hodzic et al teaches a RZ coder, modulating the output of an optical source using the RZ electronic data signal, alternating the polarization of the RZ optical signal using a modulator (polarization modulator in Figure 1) such that successive optical bits have substantially orthogonal polarizations to generate an APol-RZ signal.

Hodzic discloses that the APol-RZ signals with orthogonal polarization between adjacent bits cause significant improvement of system performance through suppression of non-linear effects compared with RZ and NRZ format, the APol-RZ modulation format significantly improves the maximum input power, shows 7-10 dB improvement compared to RZ and NRZ format, the alternate polarization of adjacent bits reduces the power transfer between adjacent bits resulting also in suppression of intrachannel effects; and the APol-RZ possesses better PMD characteristics than RZ and NRZ, has better dispersion tolerance; the maximum transmission distance can be enhanced with factor of 2 by using this modulation method. Hodzic et al teaches that the alternate polarization format remains the best choice modulation format (page 155 left column).

As the polarization modulator as taught by Hodzic is applied to the DPSK format of Chraplyvy et al, that is, combine a polarization modulator with the phase modulator (105 in Figure 3 of Chraplyvy), it is obvious to one skilled in the art that the differential encoder (e.g., 313 in Figure 3) must be set as a two-bit delay precoder and the demodulator (501 in Figure 5) must be a two-bit delay line interferometer. After the polarization modulator, the bits 1, 3, 5, ... 2n-1 have one kind of polarization, and the bits 2, 4, 6, ... 2n has another polarization which is orthogonal to the polarization of "odd" bits; at the receiver, theoretically, the "odd" bits and the "even" bits do not interfere (or coherently add or subtract) with each other at the balanced detector because they are orthogonally polarized. That is, the two sets of data bits can be treated independently; since bit "1" and bit "3" has a two-bit periods of time interval, to get the

DPSK benefit and restore the original data, the bits 1, 3, 5, ... 2n-1 need to be encoded by differentially phase shift keying between any two bits separated by two-bit slots (or even number of bit periods), so to generate “odd” bits conventional DPSK signal, same is for bits 2, 4, 6, ... 2n. And to decode the DPSK signal or restore the original data, the 2-bit delay interferometer must be used since each set of data is encoded by two-bit delay at the transmitter.

To precode the data by two-bit delay is not new in the art; theoretically, the conventional DPSK format can be generate with differentially phase shift keying between any two bits separated by one bit slot, two-bit slots or other number of bit slots as long as the demodulator has the same number of bit delay. Miyamoto et al, in the same field of endeavor, teaches a method to generate a DPSK format with a precoder having delay of 2-bit slots (2 in Figure 17, column 16 line 34 to column 7 line 16, and column 27 line 24-34), the precoded signal drives the phase modulator (5 in Figure 17), and differential phase shift keying signal (encoded with two bits separated by two bits) is outputted from the phase modulator (Figure 18). Miyamoto et al also teaches a two-bit delay interferometer (5 in Figure 17) to demodulate the differential phase shift keying signal and get the RZ (with phase modulated) signal (Figure 18, note: except the phase, Figure 18G is the same as the data signal shown in 18A, the direct detector 66 which responses to the intensity will restore the data as Figure 18A).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the alternate polarization format and two-bit delay precoder and demodulator as taught by Hodzic et al and Miyamoto et al to the system

of Chraplyvy et al so that a APol-DPSK modulation format can be obtained, and the intrachannel nonlinear distortion can be reduced, and system performance can be significantly enhanced, and the transmission distance can be significantly increased.

But, the combination of Chraplyvy et al and Hodzic et al and Miyamoto et al teaches two modulators: one for phase modulation and anther for polarization modulation. Chraplyvy et al and Hodzic et al and Miyamoto et al do not expressly teach single modulator including a polarization rotation device in at least one arm to provide simultaneous polarization alternation and optical data encoding by phase shift keying to generate the APol-DPSK signal and wherein input signals to both arms of the Mach-Zehnder modulator have polarizations that are the same.

However, Heismann et al, in the same field of endeavor, teaches a Mach-Zehnder modulator including a polarization rotation device (the 90 degree Rotated PMF in Figure 2) in at least one arm to provide simultaneous polarization alternation and optical data phase modulation (Figure 2, equations (5) (7) and (10), page 313-314) wherein input signals to both arms of the Mach-Zehnder modulator have polarizations that are the same (0 degree linear input SOP in Figure 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the modulator as taught by Heismann et al to the system of Chraplyvy et al and Hodzic et al and Miyamoto et al to the system of so that an integrated monolithic modulator can be obtained and a high speed APol-DPSK can be generated with the single modulator, and system cost can be decreased.

2). With regard to claim 13, Chraplyvy et al and Hodzic et al and Miyamoto et al and Heismann et al disclose all of the subject matter as applied to claim 10 above, and Heismann et al further discloses wherein the polarization rotation device is a half-wave plate (the 90 degree rotated PMF in Heisman is a half-wave plate: retards one polarization by half wavelength or π phase retardation, so to rotate the polarization by 90 degree).

11. Claims 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chraplyvy et al (US 2003/0007216) in view of Hodzic et al (Hodzic et al: "Improvement of System Performance in N x 40-Gb/s WDM Transmission Using Alternate Polarizations", IEEE Photonics Techmology Letters, Vol. 15, No. 1, Jan 2003, pages 153-155) and Miyamoto et al (US 7,116,917) and Heismann et al (Heismann et al: “High-Speed Polarization Scrambler with Adjustable Phase Chirp”, IEEE Journal of Selected Topic in Quantum Electronics, Vol. 2, No. 2, June 1996, page 311-318) and Kplan et al (US 7,272,271).

Chraplyvy et al an optical transmitter (Figure 3) for DPSK transmission comprising:

an optical source (DFB Laser 101 in Figure 3);

a precoder (e.g., the differential encoder 313 in Figure 3);

a Mach-Zehnder (MZ) modulator device optically coupled to the laser source (e.g., [0023], the phase modulator 105 coupled to the laser source via pulse carver 103);

drive circuitry coupled to the MZ modulator device to drive a MZ modulator using a precoded data signal from the precoder (the electrical signal from the encoder to drive the phase modulator).

But, Chraplyvy et al does not disclose: an APol-DPSK transmitter, and the Mach-Zehnder (MZ) modulator device having a half-wave plate in one arm; wherein input signals to both arms of the Mach-Zehnder modulator have polarizations that are the same; and drive circuitry coupled to the MZ modulator device to drive the MZ modulator using a precoded data signal from the precoder to simultaneously provide polarization alternation and optical data encoding of an optical signal using phase shift keying between two optical bits separated by an even number of bit periods.

However, it is well known in the art that the alternate polarization format with adjacent bits have orthogonal polarization can be used to significantly reduce the intrachannel nonlinear distortion. Hodzic teaches such a method to generate APol-RZ signal (alternate polarization return-to-zero signal) (Figure 1). Hodzic et al teaches a RZ coder or drive circuitry, modulating the output of an optical source using the RZ electronic data signal, alternating the polarization of the RZ optical signal using a modulator (polarization modulator in Figure 1) such that successive optical bits have substantially orthogonal polarizations to generate an APol-RZ signal.

Hodzic discloses that the APol-RZ signals with orthogonal polarization between adjacent bits cause significant improvement of system performance through suppression of non-linear effects compared with RZ and NRZ format, the APol-RZ modulation format significantly improves the maximum input power, shows 7-10 dB

improvement compared to RZ and NRZ format, the alternate polarization of adjacent bits reduces the power transfer between adjacent bits resulting also in suppression of intrachannel effects; and the APol-RZ possesses better PMD characteristics than RZ and NRZ, has better dispersion tolerance; the maximum transmission distance can be enhanced with factor of 2 by using this modulation method. Hodzic et al teaches that the alternate polarization format remains the best choice modulation format (page 155 left column).

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2-bit delay interferometer must be used since each set of data is encoded by two-bit delay at the transmitter.

To precode the data by two-bit delay is not new in the art; theoretically, the conventional DPSK format can be generate with differentially phase shift keying between any two bits separated by one bit slot, two-bit slots or other number of bit slots as long as the demodulator has the same number of bit delay. Miyamoto et al, in the same field of endeavor, teaches a method to generate a DPSK format with a precoder having delay of 2-bit slots (2 in Figure 17, column 16 line 34 to column 7 line 16, and column 27 line 24-34), the precoded signal drives the phase modulator (5 in Figure 17), and differential phase shift keying signal (encoded with two bits separated by two bits) is outputted from the phase modulator (Figure 18). Miyamoto et al also teaches a two-bit delay interferometer (5 in Figure 17) to demodulate the differential phase shift keying signal and get the RZ (with phase modulated) signal (Figure 18, note: except the phase, Figure 18G is the same as the data signal shown in 18A, the direct detector 66 which responses to the intensity will restore the data as Figure 18A).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the alternate polarization format and two-bit delay precoder and demodulator as taught by Hodzic et al and Miyamoto et al to the system of Chraplyvy et al so that a APol-DPSK modulation format can be obtained, and the intrachannel nonlinear distortion can be reduced, and system performance can be significantly enhanced, and the transmission distance can be significantly increased.

But, the combination of Chraplyvy et al and Hodzic et al and Miyamoto et al teaches two modulators: one for phase modulation and anther for polarization modulation. Chraplyvy et al and Hodzic et al and Miyamoto et al do not expressly teach single Mach-Zehnder (MZ) modulator device having a half-wave plate in one arm that can provide both phase modulation and polarization modulation.

However, Heismann et al, in the same field of endeavor, teaches a Mach-Zehnder modulator modulator device (Figure 2) having a half-wave plate in one arm (the 90 degree Rotated PMF in Figure 2); wherein input signals to both arms of the Mach-Zehnder modulator have polarizations that are the same (0 degree linear input SOP in Figure 2); and drive circuitry (the circuitry which generates V1 and V2 driving signals) coupled to the MZ modulator device to drive the MZ modulator to simultaneously provide polarization alternation and phase modulation (Figure 2, equations (5) (7) and (10), page 313-314).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the modulator as taught by Heismann et al to the system of Chraplyvy et al and Hodzic et al and Miyamoto et al to the system of so that an integrated monolithic modulator can be obtained and a high speed APol-DPSK can be generated with the single modulator, and system cost can be decreased.

12. Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chraplyvy et al (US 2003/0007216) in view of Hodzic et al (Hodzic et al: "Improvement of System Performance in N x 40-Gb/s WDM Transmission Using Alternate

Polarizations", IEEE Photonics Techmology Letters, Vol. 15, No. 1, Jan 2003, pages 153-155) and Miyamoto et al (US 7,116,917) and Kaplan et al (US 7,272,271).

1). With regard to claims 12 and 14, Chraplyvy et al a method of DPSK transmission comprising:

precoding an electronic data signal (e.g., the differential encoder 313 in Figure 3;

using the precoded electronic data signal to drive a Mach-Zehnder modulator (e.g., the modulator 105 drove by the electronic data from the encoder 313) to generate DPSK signal; and demodulate the DPSK using one bit delay line interferometer (Figure 5).

But, Chraplyvy et al does not disclose: the modulator including a polarization rotation device in at least one arm to provide simultaneous polarization alternation and optical data encoding by phase shift keying between two optical bits separated by an even number of bit periods to generate an APol-DPSK signal; wherein input signals to both arms of the Mach-Zehnder modulator have polarizations that are the same; and demodulating the APol-DPSK signal using an even bit delay line interferometer.

However, it is well known in the art that the alternate polarization format with adjacent bits have orthogonal polarization can be used to significantly reduce the intrachannel nonlinear distortion. Hodzic teaches such a method to generate APol-RZ signal (alternate polarization return-to-zero signal) (Figure 1). Hodzic et al teaches a RZ coder, modulating the output of an optical source using the RZ electronic data signal, alternating the polarization of the RZ optical signal using a modulator (polarization

modulator in Figure 1) such that successive optical bits have substantially orthogonal polarizations to generate an APol-RZ signal.

Hodzic discloses that the APol-RZ signals with orthogonal polarization between adjacent bits cause significant improvement of system performance through suppression of non-linear effects compared with RZ and NRZ format, the APol-RZ modulation format significantly improves the maximum input power, shows 7-10 dB improvement compared to RZ and NRZ format, the alternate polarization of adjacent bits reduces the power transfer between adjacent bits resulting also in suppression of intrachannel effects; and the APol-RZ possesses better PMD characteristics than RZ and NRZ, has better dispersion tolerance; the maximum transmission distance can be enhanced with factor of 2 by using this modulation method. Hodzic et al teaches that the alternate polarization format remains the best choice modulation format (page 155 left column).

As the polarization modulator as taught by Hodzic is applied to the DPSK format of Chraplyvy et al, that is, combine a polarization modulator with the phase modulator (105 in Figure 3 of Chraplyvy), it is obvious to one skilled in the art that the differential encoder (e.g., 313 in Figure 3) must be set as a two-bit delay precoder and the demodulator (501 in Figure 5) must be a two-bit delay line interferometer. After the polarization modulator, the bits 1, 3, 5, ... 2n-1 have one kind of polarization, and the bits 2, 4, 6, ... 2n has another polarization which is orthogonal to the polarization of "odd" bits; at the receiver, theoretically, the "odd" bits and the "even" bits do not interfere (or coherently add or subtract) with each other at the balanced detector because they

are orthogonally polarized. That is, the two sets of data bits can be treated independently; since bit “1” and bit “3” has a two-bit periods of time interval, to get the DPSK benefit and restore the original data, the bits 1, 3, 5, ... 2n-1 need to be encoded by differentially phase shift keying between any two bits separated by two-bit slots (or even number of bit periods), so to generate “odd” bits conventional DPSK signal, same is for bits 2, 4, 6, ... 2n. And to decode the DPSK signal or restore the original data, the 2-bit delay interferometer must be used since each set of data is encoded by two-bit delay at the transmitter.

To precode the data by two-bit delay is not new in the art; theoretically, the conventional DPSK format can be generate with differentially phase shift keying between any two bits separated by one bit slot, two-bit slots or other number of bit slots as long as the demodulator has the same number of bit delay. Miyamoto et al, in the same field of endeavor, teaches a method to generate a DPSK format with a precoder having delay of 2-bit slots (2 in Figure 17, column 16 line 34 to column 7 line 16, and column 27 line 24-34), the precoded signal drives the phase modulator (5 in Figure 17), and differential phase shift keying signal (encoded with two bits separated by two bits) is outputted from the phase modulator (Figure 18). Miyamoto et al also teaches a two-bit delay interferometer (5 in Figure 17) to demodulate the differential phase shift keying signal and get the RZ (with phase modulated) signal (Figure 18, note: except the phase, Figure 18G is the same as the data signal shown in 18A, the direct detector 66 which responses to the intensity will restore the data as Figure 18A).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the alternate polarization format and two-bit delay precoder and demodulator as taught by Hodzic et al and Miyamoto et al to the system of Chraplyvy et al so that a APol-DPSK modulation format can be obtained, and the intrachannel nonlinear distortion can be reduced, and system performance can be significantly enhanced, and the transmission distance can be significantly increased.

But, the combination of Chraplyvy et al and Hodzic et al and Miyamoto et al teaches two modulators: one for phase modulation and anther for polarization modulation. Chraplyvy et al and Hodzic et al and Miyamoto et al do not expressly teach single modulator including a polarization rotation device in at least one arm to provide simultaneous polarization alternation and optical data encoding by phase shift keying to generate the APol-DPSK signal and wherein input signals to both arms of the Mach-Zehnder modulator have polarizations that are the same.

However, Kaplan, in the same field of endeavor, teaches a Mach-Zehnder modulator (Figure 3a) including a polarization rotation device (the phase shifter 107) in at least one arm to provide simultaneous polarization alternation and optical data phase modulation (Figures 2 and 3, column 5, line 17-62, Figure 2 shows the constellation under the modulation by the modulator) wherein input signals to both arms of the Mach-Zehnder modulator have polarizations that are the same (polarized in 45 degree, column 5, line 35-36). Kaplan clearly teaches that the single modulator can be used for simultaneously phase and polarization modulations (column 5, line 58-62, Figure 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the modulator as taught by Kaplan et al to the system of Chraplyvy et al and Hodzic et al and Miyamoto et al to the system of so that an integrated monolithic modulator can be obtained and a high speed APol-DPSK can be generated with the single modulator, and system cost can be decreased.

2). With regard to claim 13, Chraplyvy et al and Hodzic et al and Miyamoto et al and Kaplan et al disclose all of the subject matter as applied to claim 10 above, and Heismann et al and Kaplan et al further discloses wherein the polarization rotation device is a half-wave plate (the 90 degree phase shifter 107 is a half-wave plate: retards one polarization by half wavelength or π phase retardation, so to rotate the polarization by 90 degree).

13. Claims 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chraplyvy et al (US 2003/0007216) in view of Hodzic et al (Hodzic et al: "Improvement of System Performance in N x 40-Gb/s WDM Transmission Using Alternate Polarizations", IEEE Photonics Techmology Letters, Vol. 15, No. 1, Jan 2003, pages 153-155) and Miyamoto et al (US 7,116,917) and Kaplan et al (US 7,272,271).

Chraplyvy et al an optical transmitter (Figure 3) for DPSK transmission comprising:

an optical source (DFB Laser 101 in Figure 3);

a precoder (e.g., the differential encoder 313 in Figure 3);

a Mach-Zehnder (MZ) modulator device optically coupled to the laser source (e.g., [0023], the phase modulator 105 coupled to the laser source via pulse carver 103);

drive circuitry coupled to the MZ modulator device to drive a MZ modulator using a precoded data signal from the precoder (the electrical signal from the encoder to drive the phase modulator).

But, Chraplyvy et al does not disclose: an APol-DPSK transmitter, and the Mach-Zehnder (MZ) modulator device having a half-wave plate in one arm; wherein input signals to both arms of the Mach-Zehnder modulator have polarizations that are the same; and drive circuitry coupled to the MZ modulator device to drive the MZ modulator using a precoded data signal from the precoder to simultaneously provide polarization alternation and optical data encoding of an optical signal using phase shift keying between two optical bits separated by an even number of bit periods.

However, it is well known in the art that the alternate polarization format with adjacent bits have orthogonal polarization can be used to significantly reduce the intrachannel nonlinear distortion. Hodzic teaches such a method to generate APol-RZ signal (alternate polarization return-to-zero signal) (Figure 1). Hodzic et al teaches a RZ coder or drive circuitry, modulating the output of an optical source using the RZ electronic data signal, alternating the polarization of the RZ optical signal using a modulator (polarization modulator in Figure 1) such that successive optical bits have substantially orthogonal polarizations to generate an APol-RZ signal.

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DPSK benefit and restore the original data, the bits 1, 3, 5, ... 2n-1 need to be encoded by differentially phase shift keying between any two bits separated by two-bit slots (or even number of bit periods), so to generate “odd” bits conventional DPSK signal, same is for bits 2, 4, 6, ... 2n. And to decode the DPSK signal or restore the original data, the 2-bit delay interferometer must be used since each set of data is encoded by two-bit delay at the transmitter.

To precode the data by two-bit delay is not new in the art; theoretically, the conventional DPSK format can be generate with differentially phase shift keying between any two bits separated by one bit slot, two-bit slots or other number of bit slots as long as the demodulator has the same number of bit delay. Miyamoto et al, in the same field of endeavor, teaches a method to generate a DPSK format with a precoder having delay of 2-bit slots (2 in Figure 17, column 16 line 34 to column 7 line 16, and column 27 line 24-34), the precoded signal drives the phase modulator (5 in Figure 17), and differential phase shift keying signal (encoded with two bits separated by two bits) is outputted from the phase modulator (Figure 18). Miyamoto et al also teaches a two-bit delay interferometer (5 in Figure 17) to demodulate the differential phase shift keying signal and get the RZ (with phase modulated) signal (Figure 18, note: except the phase, Figure 18G is the same as the data signal shown in 18A, the direct detector 66 which responses to the intensity will restore the data as Figure 18A).

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However, Kaplan, in the same field of endeavor, teaches a Mach-Zehnder modulator (Figure 3a) having a half-wave plate in one arm (the phase shifter 107); wherein input signals to both arms of the Mach-Zehnder modulator have polarizations that are the same (polarized in 45 degree, column 5, line 35-36); and drive circuitry (the circuitry which generates 110-113 driving signals) coupled to the MZ modulator device to drive the MZ modulator to simultaneously provide polarization alternation and phase modulation (Figures 2 and 3, column 5, line 17-62, Figure 2 shows the constellation under the modulation by the modulator). Kaplan clearly teaches that the single modulator can be used for simultaneously phase and polarization modulations (column 5, line 58-62, Figure 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the modulator as taught by Kaplan et al to the system of Chraplyvy et al and Hodzic et al and Miyamoto et al to the system of so that

an integrated monolithic modulator can be obtained and a high speed APol-DPSK can be generated with the single modulator, and system cost can be decreased.

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claim 31 is rejected under 35 U.S.C. 102(b) as being anticipated by Miyamoto et al (US 2003/0002121).

Miyamoto et al teaches a method, comprising: encoding data by differential phase shift keying between non-adjacent bits wherein the non-adjacent bits are separated by an even number of bit periods (two bit delay differential phase shift keying, Figures 17 and 18, [0144]-[0147]).

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ito (US 6,650,846);

Franco et al: "10 Gbit/s alternate polarization soliton transmission over 300km step-index fibre link with no in-line control", ECOC'98, 20-24 September 1998, pages 95-96.

Bergano et al: " Bit-synchronous polarization and phase modulation scheme for improving the performance of optical amplifier transmission systems", Electronics Letters, 4 January 1996, Vol. 32, No.1, pages 52-54.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LI LIU whose telephone number is (571)270-1084. The examiner can normally be reached on Mon-Fri, 8:00 am - 5:30 pm, alternating Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. L./
Examiner, Art Unit 2613
October 8, 2008

/Kenneth N Vanderpuye/
Supervisory Patent Examiner, Art Unit 2613